T.O. 12R5-2ARN-102
(Formerly AN 16-35AS215-2)

HANDBOOK
MAINTENANCE INSTRUCTIONS

ANTENNA ASSEMBLY
AS-215/ARN

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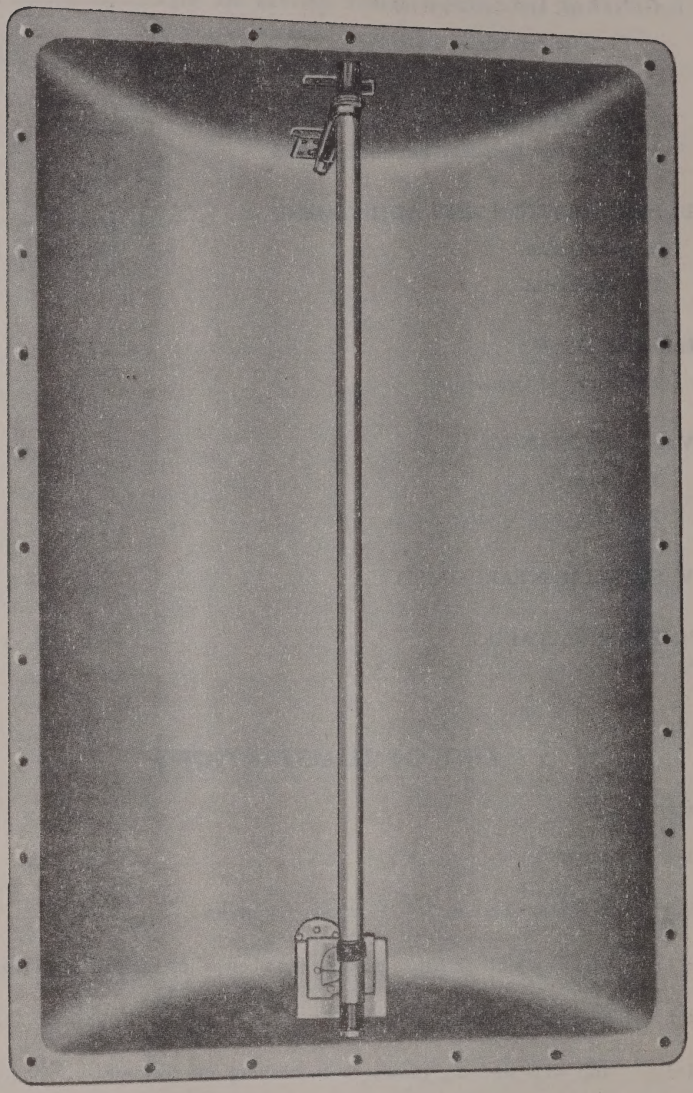

Figure 1-1 Antenna Assembly AS-215/ARN

SECTION 1

GENERAL DESCRIPTION

1. PURPOSE AND CHARACTERISTICS.

a. Antenna Assembly AS215/ARN is a combination antenna and reflector designed for mounting in the fuselage of an aircraft.

b. Antenna Assembly AS215/ARN is intended for use in receiving the 75 megacycle marker transmission from Z, fan, instrument approach, and landing marker transmitters. The antenna delivers the received signal to a low-loss coaxial transmission line whose characteristic impedance is approximately 52 ohms.

c. Antenna Assembly AS215/ARN is designed so that it can be mounted entirely within the fuselage of the aircraft, thereby eliminating any possibility of aerodynamic drag or ice collection.

2. DESCRIPTION. (Fig. 1-1)

a. Antenna Assembly AS215/ARN consists of a Duralumin housing of sectioned cylindrical shape approximately 20 inches long with a cylinder radius of 6 inches. This semi-cylinder forms the reflector and houses the antenna proper. The antenna pick-up rod consists of a silver-plated brass tube 18 inches in length with a one-half inch outside diameter. The Antenna tube is held in position within the reflector by plastic plugs fastened to the ends of the cylindrical shield and extending into the antenna tube. The plugs used in the later model antennas are fabricated from Rex Corp. Rexolite No. 1422. The earlier plugs were fabricated from Dielectine. A plastic sheet (not supplied) is mounted across the reflector and forms the "window" through which signals are received. A variable loading condenser connects from the free end of the antenna tube to the reflector, a fixed condenser connects from the feed end to the reflector. A short length of RG-8/U coaxial line connects the feed end of the pick-up rod to a connector (SO-239) mounted in one end of the reflector. (Fig. 1-2.)

b. The space required for mounting in the fuselage of the aircraft is approximately 12 x 20 inches.

3. EQUIPMENT SUPPLIED.

Quantity per Equipment	*Name of Unit*	*Army Type Designation*	*Navy Type Designation*	*Overall Dimensions*	*Weight*
1	Marker Antenna	AS215/ARN		20½" x 13" x 6" x ⅝"	2.8 lbs.

4. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Quantity per Equipment	*Name of Unit*	*Army Type Designation*	*Navy Type Designation*	*Required Characteristics*
1	Plastic Window			Fiberglass cover (selectron 5003)
1	Plug			To fit connector SO-239
1	Cable			RG-8/U coaxial cable of sufficient length to reach from antenna to receiver.
1	Rectangular Mounting Strip			Stamped Duralumin strip.
1	Power Source			Crystal controlled 75 megacycle transmitter, 4 to 5 watts output.
1	Test Meter			Probe Voltmeter using diode Rectifier.
1	Transmission Line			50 ohm slotted Transmission Line 90 to 100 inches in length.
1	Adjusting Tool			Non-metallic screwdriver.
1	Flexible Line			See Section II, 2, *f.*

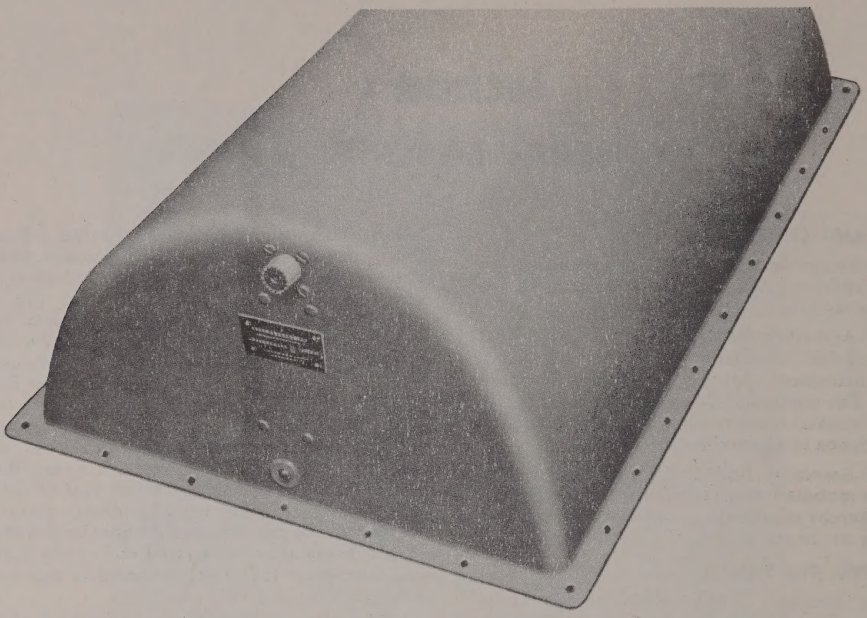

Figure 1-2 End View Showing SO-239 Socket Connector

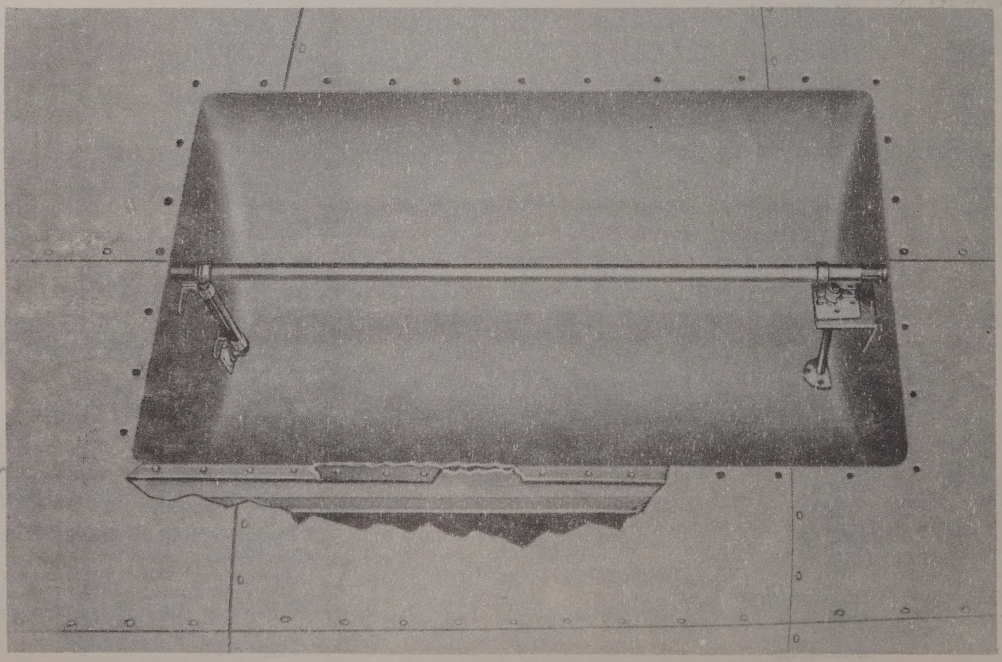

Figure 2-1 Cutaway View Showing Framing Member as Installed in Airplane

SECTION II

INSTALLATION AND ADJUSTMENT

1. INSTALLATION. (Fig. 2-1)

a. Antenna Assembly AS215/ARN is designed to mount entirely inside the fuselage of an all-metal aircraft. Marker transmissions are received from directly below the aircraft in flight, consequently it is necessary to mount the antenna in the bottom of the fuselage.

b. The mounting position of the antenna should be on the centerline of the aircraft and the antenna pick-up rod should be approximately horizontal with the ground surface when the aircraft is in flight. The long dimension (20 inches) of the antenna must be in the line of flight.

c. Antenna Assembly AS215/ARN is mounted with its plastic covering protruding from a hole in the bottom of the fuselage. The hole should be approximately 20 inches by 12 inches.

d. The cylindrical reflector housing the antenna pick-up rod is covered by a plastic window (not supplied) which is bolted to the flange on the reflector. A rectangular duralumin stamping (not furnished) is bolted to the reflector flange in such a manner that good electrical contact is insured between the strip and flange. The duralumin stamping is, in turn, bolted to the aircraft skin in such a manner that good electrical contact is obtained between the stamping and skin. The Marker Antenna reflector therefore is electrically a portion of the aircraft structure.

e. Antenna Assembly AS215/ARN is designed for use with a low-loss transmission line of 52 ohms impedance. RG-8/U cable is recommended. The antenna should be so mounted that a plug (not supplied) attached to the transmission line cable can be conveniently connected to cable connector, SO-239, attached to one end of the reflector. (See Frontispiece.)

f. The transmission line from Marker Antenna to receiver should be kept as short as possible although the losses in a line such as the RG-8/U are reasonably low. The signal will not be seriously reduced by any length of line necessary to inter-connect the antenna and receiver in present day aircraft.

2. ADJUSTMENT.

a. Antenna Assembly AS215/ARN is most conveniently adjusted (tuned) before installation in an aircraft. Adjustment, or tuning, results in production of the desired impedance of 52 ohms at the SO-239 connector on the end of the antenna when the antenna is installed in the aircraft. Adjustment cannot be conveniently made in the aircraft since the antenna is not generally installed in a position where it is possible to view the marker lights on the instrument panel of the aircraft.

b. Antenna Assembly AS215/ARN is carefully adjusted after manufacture. If readjustment becomes necessary, the antenna should be mounted in the center of a metal sheet three feet wide by eight feet high. Installation of the Marker Antenna in this sheet should simulate as closely as possible mounting within the aircraft insofar as electrically bonding the antenna to the metal sheet is concerned. The plastic window should be in place and the metal rim holding the antenna to the sheet should be securely fastened. It will be noted that this antenna installation differs from its mounting in the aircraft only in that it is in a vertical plane.

Note

When making the tuning adjustments, metallic objects should be kept well away from the antenna window in the metallic sheet.

c. Antenna Assembly AS215/ARN, mounted in the metal sheet, can be most readily adjusted by measuring the standing wave ratio on a slotted transmission line with a probe voltmeter.

d. The probe voltmeter is shown diagrammatically in figure 2-2. Switch S-1 provides a high and low range. The meter is mounted in a metal housing which also contains the rectifier tube and its filament battery. A wheel connected to the rectifier tube input serves as a probe to contact the inner conductor of the slotted transmission line described in the following paragraph. Four additional wheels, attached to the meter housing, contact the outer conductor of the slotted line. These wheel probes allow the probe voltmeter to be readily moved along the slotted transmission line to facilitate standing wave ratio measurements.

e. The slotted transmission line consists of an outer tube of duralumin having an inside diameter of 2.37 inches with an inner conductor of 1 inch outside diameter. A slot ½ inch wide is cut lengthwise in the outer tube so that a voltmeter probe can be used to measure the line voltage. A minimum number of polystyrene or dilectine insulators should be used to space the inner and outer conductors. The overall length of the line should be more than a half wavelength, the recommended length being 90 to 100 inches for this purpose. The line should be terminated at both ends by SO-239 plugs to facilitate connection to the antenna and source.

f. A length of flexible transmission line, a half wavelength long (50 inches) fitted with a connector at either end to attach to the SO-239 plug on the Marker Antenna and slotted transmission line, is useful in interconnecting these devices.

g. With Antenna Assembly AS215/ARN mounted in its metal sheet, tuning is accomplished as follows:

(1) Connect the output of a 75 megacycle crystal controlled source (4 to 5 watts) through the slotted transmission line to the Marker Antenna. If necessary use the flexible line described in paragraph 2., *f.*, for inter-connection.

(2) Loosen the locknut on the shaft clamp bushing

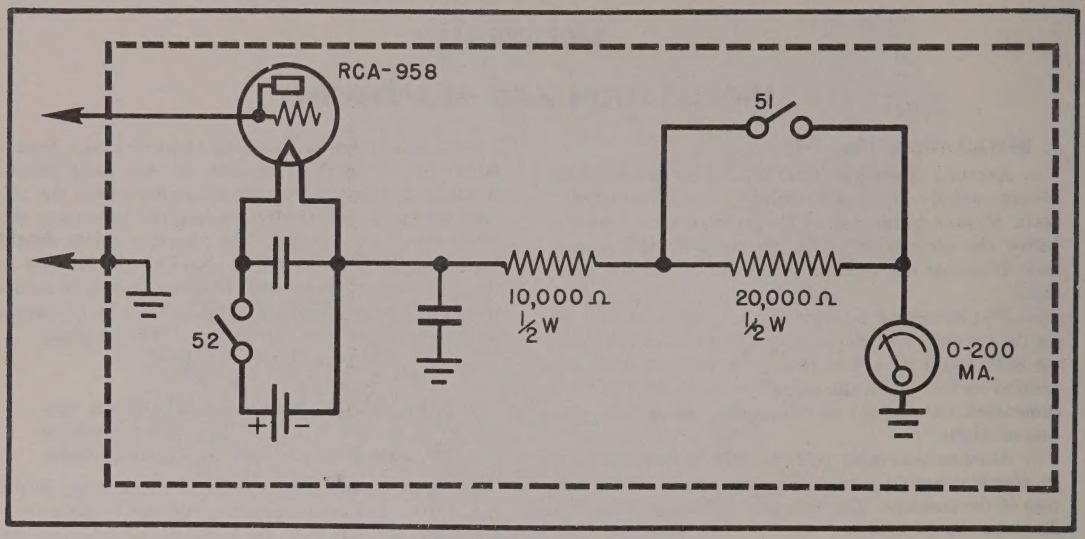

Figure 2-2 Diagram of Probe Voltmeter

until the variable condenser shaft is free to turn. (Fig. 2-3.)

(3) Measure the standing wave ratio on the slotted transmission line using the probe voltmeter. Move the voltmeter along the line to locate points of maximum and minimum readings. The ratio of maximum to minimum reading should lie between 1.00 and 1.25.

(4) If the standing wave ratio differs from the desired value, rotate the variable condenser in small steps by means of the adjustment screwdriver, measuring the standing wave ratio after each adjustment.

(5) Continue this adjustment until the standing wave ratio lies between 1.00 and 1.25, the desired value approaching 1.00.

(6) Tighten shaft bushing locknut making certain that the adjustment is not disturbed during this operation.

(7) The antenna is now properly tuned and may be installed in an aircraft.

Note

If rotation of the variable condenser fails to provide the proper standing wave ratio some defect in the Marker Antenna is indicated.

SECTION III

OPERATION

1. THEORY OF OPERATION. (Fig. 3-1)

a. Antenna Assembly AS215/ARN consists essentially of an antenna pick-up rod backed by a reflector, the length of the rod and its spacing within the cylindrical reflector being accurately dimensioned to the 75 megacycle marker signals to be received.

b. The antenna pick-up rod is at the focal axis of the reflector and the received signal is strengthened by the reflector action. The reflector also prevents spurious signal pickup from the highly reflective metallic skin of the aircraft and therefore restricts the sphere of signal pickup which is necessary in marker operation.

c. The antenna is derived from a half wave antenna feeding a single-wire transmission line. Condensers C-1 and C-2 are used to replace portions of the antenna in order to reduce its physical length and to permit the single wire transmission line to be replaced by the center conductor of a coaxial cable.

d. Variable condenser C-1 determines the current distribution and serves to tune the antenna. Fixed condenser C-2 of 150 micro microfarad capacity, balances out the inductive reactance and leaves a pure resistance presented to the transmission line. By proper adjustment of C-1 this resistance is made to match the characteristic impedance (52 ohms) of the transmission line.

e. Marker signals picked up by the antenna are led to the marker received through coaxial cable. The receiver actuates signal lights on the aircraft operating panel and also supplies an audio signal to a headset or the aircraft interphone system.

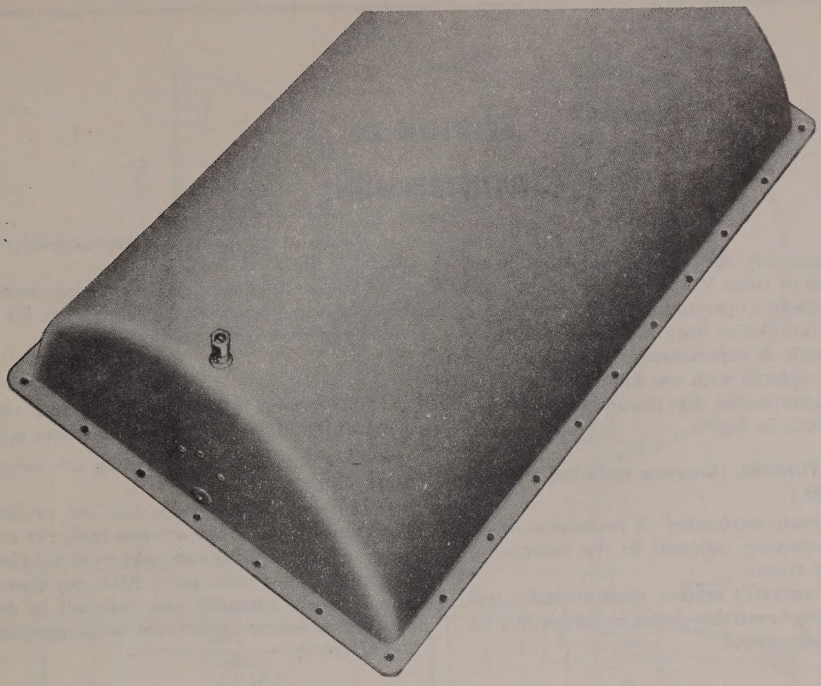

Figure 2-3 Top View Showing Tuning Shaft, Bushing and Locknut

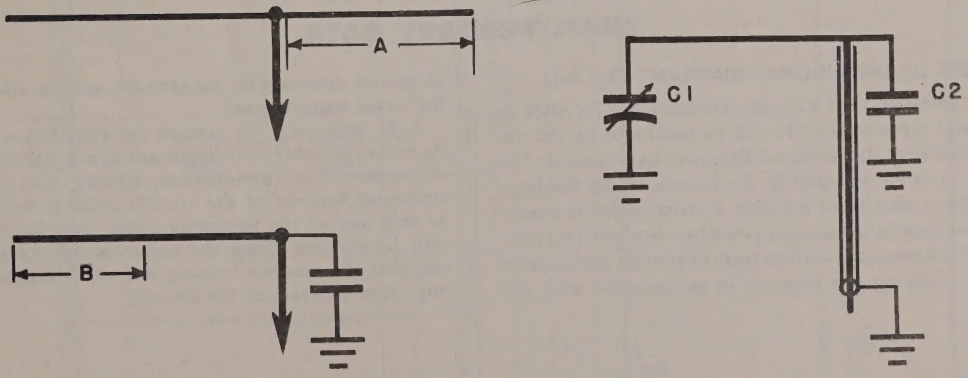

Figure 3-1 Derivation of Antenna Showing Substitution of Ends of Antenna with Capacitonce

SECTION IV

MAINTENANCE

1. GENERAL.

a. Antenna Assembly AS215/ARN remains tuned over long periods of time. Vibration and temperature changes do not affect its operation. The antenna should require no attention for at least 1000 hours of flying time. When trouble is experienced, the defective antenna should be replaced with one known to be good.

b. It is not recommended that the antenna be tuned in the aircraft while in flight.

2. EMERGENCY TUNING. (Antenna installed, aircraft not in flight.)

a. Place a properly modulated 75 megacycle signal generator or transmitter, adjacent to the antenna to produce a marker signal.

b. Extend the aircraft's marker receiver audio system from the nearest available outlet to the vicinity of the antenna tuning control.

c. Listen to the marker receiver output using a headset.

d. Loosen the locknut on the tuning condenser shaft bushing and rotate the condenser shaft for maximum audio response in the headset.

Note

The tuning is extremely sharp and requires careful adjustment of the condenser rotor.

e. Lock the shaft by tightening the locknut on the shaft bushing.

f. If the above procedure does not produce the desired result, remove the antenna from the aircraft. Remove the plastic cover and make a careful visual inspection of the component parts. Blow any dust accumulation from the assembly and re-install in the aircraft. Proceed to retune as outlined in paragraphs 2., *c.*, *d.*, and *e.*, above.

SECTION V

SUPPLEMENTARY DATA

1. USE OF DIMENSIONAL DIAGRAM. (Fig. 5-1)

a. Installation of Antenna Assembly AS215/ARN in various types of aircraft will be facilitated by the use of Figure 5-1, Dimensional Diagram. In all aircraft, the unit must be mounted in the bottom of the fuselage, on the centerline of the ship. Provisions for necessary adaptations in installation procedure to allow for structural differences in various types of aircraft can be made after studying the diagram in conjunction with the structural drawings of the aircraft, making allowance for stress requirements.

b. In preparing the aircraft for installation of the Antenna Assembly, it is important to take all indicated dimensions into consideration, making sure that no structural features of the aircraft make it impossible to drill any of the mounting holes, that the antenna will lie directly along the centerline of the aircraft and that the antenna housing will not interfere with any other function of the aircraft.

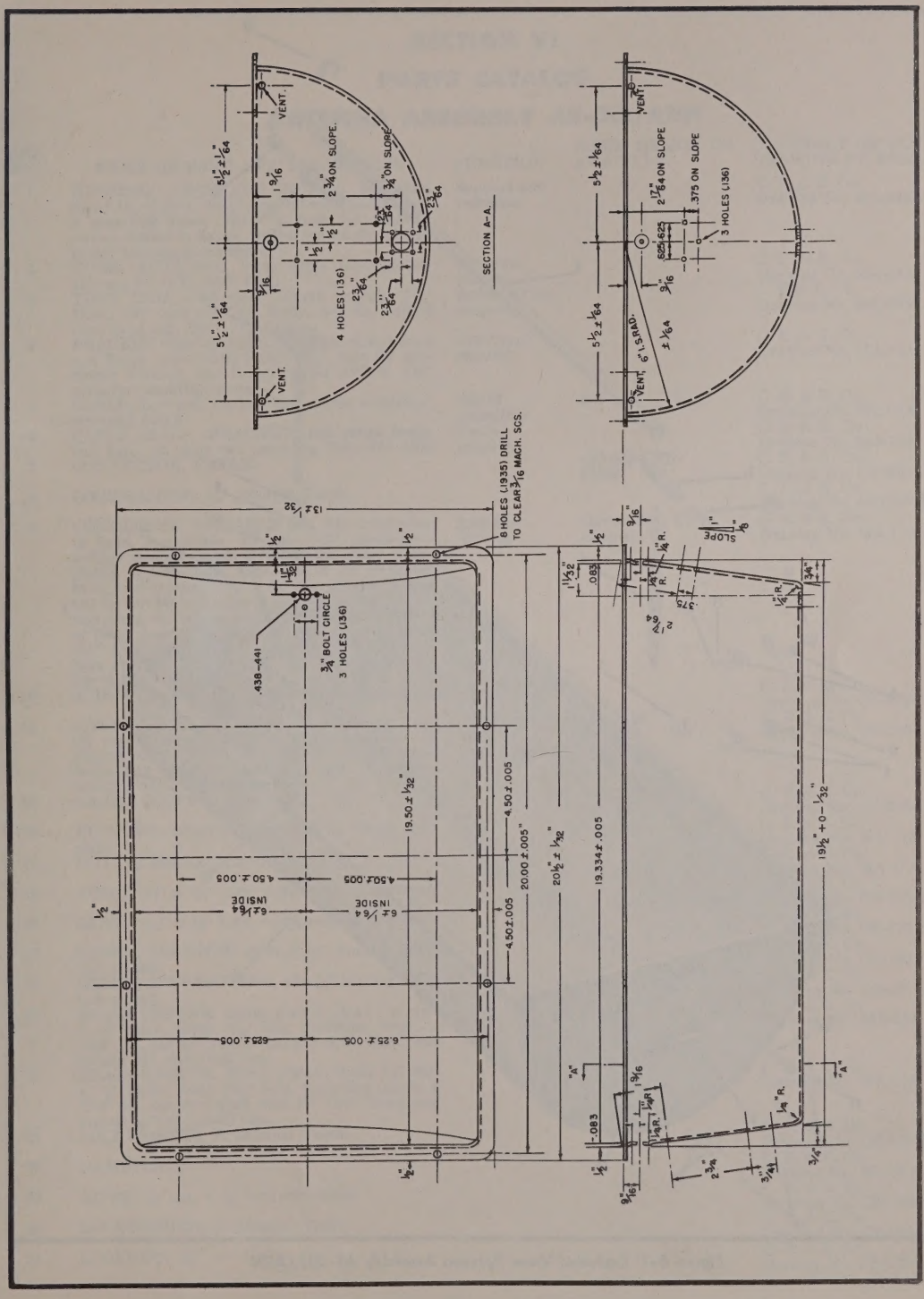

Figure 5-1 Dimensional Diagram

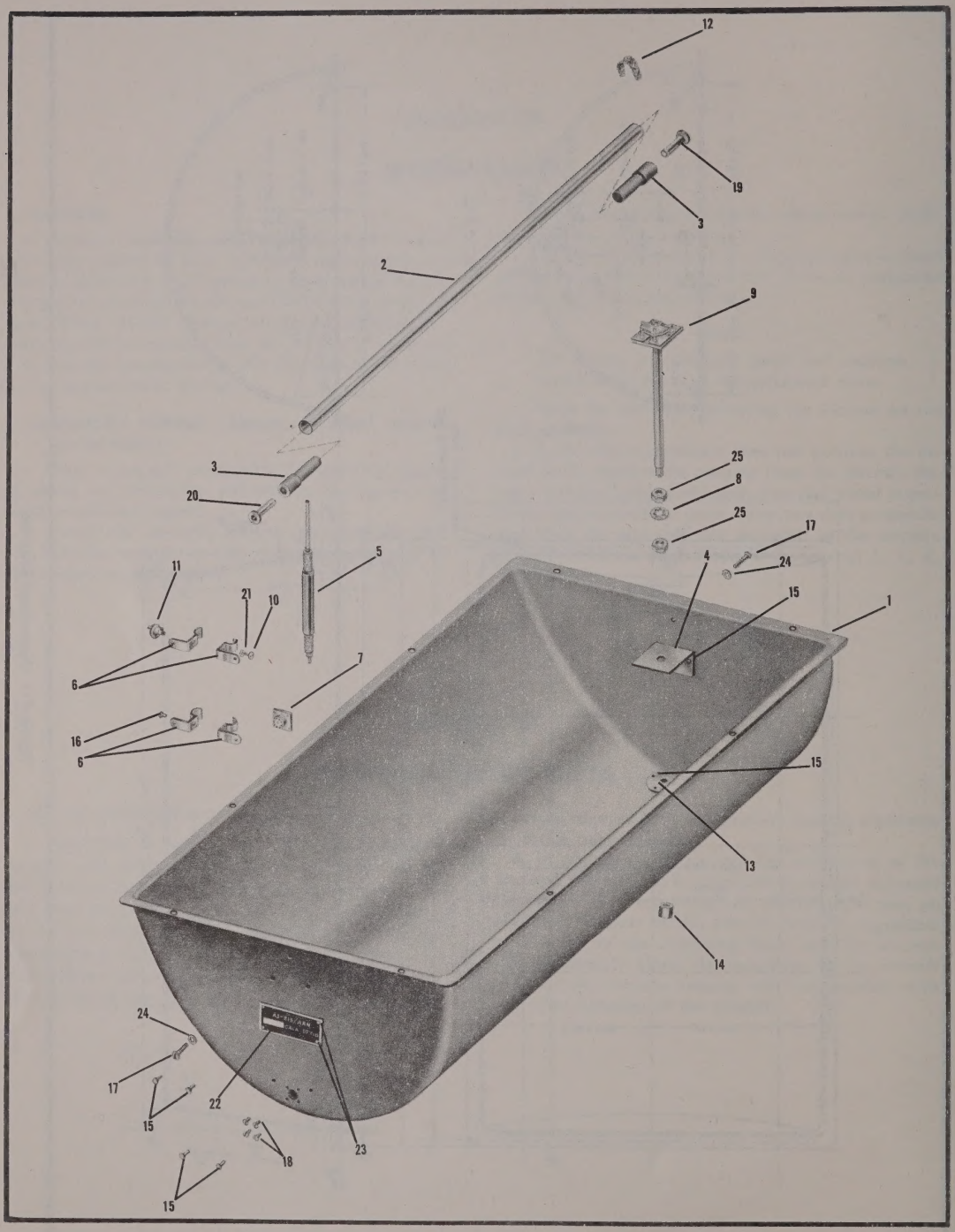

Figure 6-1 Exploded View Antenna Assembly AS-215/ARN

SECTION VI

PARTS CATALOG

ANTENNA ASSEMBLY AS-215/ARN

REF. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	MFRS. DESIGN OR AWS TYPE	CONTRACT OR GOV'T DRAWING OR SPEC. NO.
1	HOUSING, AS-215/ARN Antenna Assembly, Sheet Dural .050", 20½" long, 13" wide, 6.050" deep. 8 mounting holes, .1935" to clear 3/16" machine screws, drilled in flange. Drilled for amphenol connector and condenser shaft.	Support and reflection		C. E. & E. Co. Drawing No. MA-02E
2	TUBE, ANTENNA, brass tube, silver-plated, 18" long ½" O.D. .025" Wall.	Antenna pick-up		C. E. & E. Co. Drawing No. MA-04A
3	TUBE END, Dielectine. Length overall, 1 9/16" Head, .542" long x ½" dia. Body, .447 dia. Drilled from head end, .250", 1⅜" deep.	Antenna tube support		C. E & E. Co. Drawing No. MA-13A.
4	BRACKET CONDENSER, Sheet Dural, anodized one flange center-drilled with 11/32" hole for condenser bushing, one flange drilled with 3 .136" holes for mounting rivets.	Condenser support		C. E. & E. Co. Drawing No. MA-06A
5	CABLE, Low-loss coaxial. Single inner connector, stranded, size 8.	Signal conductor	RG-8/U	C. E. & E. Co. Drawing No. MA-07A
6	CABLE, HALF, BRACKET, #22 gauge brass, half hard, tin plate two mounting holes #30 drill.	Cable support		C. E. & E. Co. Drawing No. MA-09A
7	CONNECTOR, CABLE.		(SO-239-CPH-49194)	C. E. & E. Co. Drawing No. CE-200-1
8	LOCKWASHER, 5/16" Internal Tooth.			C. E. & E. Co. Drawing No. CE-150-[illegible]
9	CONDENSER, VARIABLE, cap. min. 1.2.3 plate (2 fixed, 1 movable) air gap .040", breakdown voltage meshed plates, 1000V Brass plates, silver-plated, ceramic base. Shaft length (to mounting threads of bushing) 4⅜" x ¼" dia. Shaft end slotted for screwdriver adjustment. Condenser dimension along shaft from end of shaft bushing to end of plate posts 1⅛". Dimensions of Ceramic base 1 5/16" x 1 1/32" x 5/32". C-C mounting holes ceramic base 1", mounting holes 3/16" dia., bushing mounting threads 5/16" dia.	Antenna Tuning	Comar Elec. Co. Chicago, Ill.	C. E. & E. Co. Drawing No. MA-12A
10	SCREW, #3-48 x 3/16", round head, cad. plate.			C. E. & E. Co. Drawing No. CE-102-2
11	CONDENSER, FIXED. 150 MMFD, Silver mica, oil impregnated, 1 section. 5% tolerance, cup shaped .450" dia., .343" depth 1 terminal—base forms 2nd. Test frequency 75 meg. Maximum working voltage 450 volts.	Balance out inductive reactance	Centralab. 830-072	C. E. & E. Co. Drawing No. CE-250-1
12	BRAID, COPPER. 3/16" wide x 2" long.			C. E. & E. Co. Drawing No. CE-225-1
13	BUSHING, SHAFT CLAMPING. Brass cad. plate.			C. E. & E. Co. Drawing No. MA-10A
14	NUT. ½" Hex. cad. plate.			C. E. & E. Co. Drawing No. MA-11A
15	RIVET, 1/8" x 3/16" long, oven head, cad. plated.			C. E. & E. Co. Drawing No. CE-175-2
16	RIVET, 1/8" x 1/8" long, oven head, cad. plated.			C. E. & E. Co. Drawing No. CE-175-1
17	SCREW, MACHINE #8-32 x ⅜" binding head, cad. plated.			C. E. & E. Co. Drawing No. CE-100-1
18	SCREW, SELF-TAPPING, #6 x ¼" binding head, cad. plated.			C. E. & E. Co. Drawing No. CE-101-1
19	BRASS CENTER. Silver plated. Head ½" dia. x 1/8" thick. Body 1 3/16" long (including head) x .248" dia. center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.			C. E. & E. Co. Drawing No. MA-05A
20	BRASS CENTER. Silver plated. Head ½" dia. x 1/8" thick. Body 1 5/16" long (including head) x .248" dia. center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.			C. E. & E. Co. Drawing No. MA-14A
21	LOCKWASHER, #3 Internal Tooth.			C. E. & E. Co. Drawing No. CE-150-[illegible]
22	NAMEPLATE.			C. E. & E. Co. Drawing No. MA-20A
23	RIVET, 3/32" dia. x 1/8" long oven head.			C. E. & E. Co. Drawing No. CE-176-1
24	LOCKWASHER, #8 Internal Tooth.			C. E. & E. Co. Drawing No. CE-150-[illegible]
25	LOCKNUT. 5/16"			C. E. & E. Co. Drawing No. CE-125-1

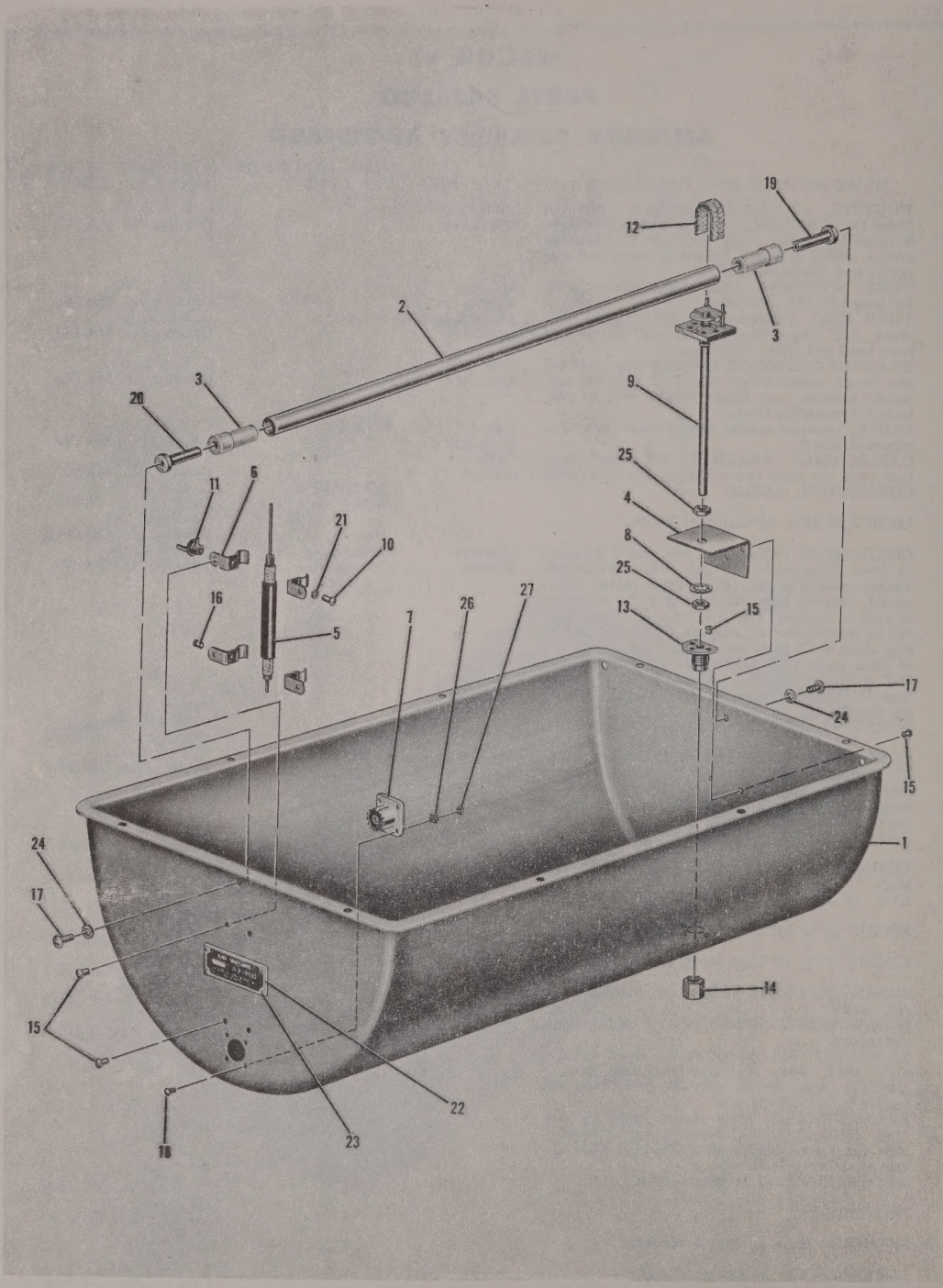

Figure 6-2 Exploded View Antenna Assembly AS-215/ARN
[For Specialty Assembling & Packing Co. Inc., Serial Nos. 800-1436 and Kings Electronics Co. Inc., (CANS)]

ANTENNA ASSEMBLY AS-215/ARN (SPECIALTY ASSEMBLING & PACKING CO. INC. SERIAL NOS. 800-1436)

REF. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	QUANTITY PER EQUIP.	MFR'S DESIGNATION OR JAN TYPE	CONTRACT GOV'T DWG. OR SPEC. NUMBER
1	HOUSING, AS-215/ARN Antenna Assembly, Sheet Dural 0.050", 20½" long, 13" wide, 6.050" deep. Eight mounting holes 0.1935" to clear 3/16" machine screw, drilled in flange, drilled for SO-239 Connector and condenser shaft.	Support and reflection	1		A.F. Dwg. No. 48D12501
2	TUBE, ANTENNA, brass, silver plated, 18" long, ½" O.D., 0.025" wall.	Antenna pick-up	1		A.F. Dwg. No. 48A12507
3	TUBE END, G.E. Textolite #1422. Length overall, 1 1/16" Head, 0.542" long x ½" dia. Body, 0.447" dia. Drilled from head end, 0.250" dia. x 1⅜" deep.	Antenna tube support	2		Spec. Pack. Co. Dwg. K-39-3X
4	BRACKET, CONDENSER, sheet Dural, anodized. One flange center-drilled with 11/32" hole for condenser bushing, second flange drilled 3 holes, 0.136" dia., for mounting rivets.	Condenser support	1		Spec. Pack. Co. Dwg. L-39-4X
5	CABLE, low-loss coaxial. Single inner conductor. Stranded size 8.	Single conductor	1	RG-8/U	A.F. Dwg. No. 48B12502
6	BRACKET, CABLE, HALF, #22 gauge brass, half-hard, silver plated, 2 mounting holes #30 drill.	Cable support	4		A.F. Dwg. No. 48B12505
7	CONNECTOR, CABLE.		1	SO-239	Spec. Pack. Co. Dwg. K-39-7XC
8	LOCKWASHER, 5/16" internal tooth.		1		No. AN936A516
9	CONDENSER, VARIABLE, 2.5 mmf minimum capacity. Three plates (2 fixed, 1 movable) air gap 0.040", breakdown voltage (plates meshed) 1000 v. Brass plates, silver plated; ceramic base. Shaft length (to mounting threads of bushing) 4⅜" x ¼" dia. Shaft end slotted for screwdriver adjustment. Condenser dimension along the shaft from end of shaft bushing to end of plate posts 1⅛". Dimensions of ceramic base 1 3/16" x 1 7/32" x 5/32". C-C mounting holes ceramic base 1", mounting holes 3/16" dia., bushing mounting threads 5/16" dia.	Antenna tuning	1		Spec. Pack. Co. Dwg. K-39-9XC
10	SCREW, #3–48 x 3/16", round head, cad. plate.		1		AN 515-3-3
11	CONDENSER, FIXED 150 mmf, silver mica, oil impregnated, one section, 2% tolerance, cup shaped, 0.450" dia. 0.343" depth. 1 terminal, base constitutes second. Test frequency 75 mc. Maximum working voltage 450 volts.	Balance out inductive reactance	1	Erie Resistor Corp., Erie, Pa., #370-FS	Spec. Pack. Co. Dwg. K-39-11X
12	BRAID, TINNED COPPER, ¼" wide x 2" long.		1		Spec. Pack. Co. Dwg. K-39-12X
13	BUSHING, SHAFT CLAMPING. Brass, silver plate.		1		A.F. Dwg. No. 48B12503
14	NUT, ½" hex, silver plated.		1		A.F. Dwg. No. 48A12510
15	RIVET, DURAL, ⅛" dia. x 5/16" long, round head.		10		AN470DD4-5
16	RIVET, DURAL, ⅛" dia. x ⅛" long, round head.		1		AN470DD4-4
17	SCREW, MACHINE, 8-32 x ⅜", binding head, cadmium plated.		2		AN526-832-6
18	SCREW, MACHINE, #4-40 x 5/16" long, round head, cadmium plated.		4		AN515-4-5
19	BRASS CENTER, silver plated. Head ½" dia. x ⅛" thick. Body 1 3/16" long (including head) x 0.248" dia., center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.		1		A.F. Dwg. No. 48A12509-2
20	BRASS CENTER, silver plated. Head ½" dia. x ⅛" thick. Body 1 3/16" long (including head) x 0.248" dia., center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.		1		A.F. Dwg. No. 48A12509-1
21	LOCKWASHER #3, internal tooth.		1		AN936A3
22	NAMEPLATE.		1		Spec. Pack. Co. Dwg. K-39-25X
23	SCREW, SELF-TAPPING #2 x ⅛" long, binding head.		4		Spec. Pack. Co. Dwg. K-39-18XC
24	LOCKWASHER, #8, internal tooth.		2		AN936A8
25	LOCKNUT 5/16"-32 NEF, brass nickel plate, 3/32" thick commercial product.		2		Spec. Pack. Co. Dwg. K-39-27XC
26	LOCKWASHER #4, external tooth, cadmium plated.		4		AN936B4
27	NUT, HEX, #4-40 x ¼" long, cadmium plated.		4		AN340-4

ANTENNA ASSEMBLY AS-215/ARN
[KINGS ELECTRONICS CO. INC. (CODE CANS)]

REF. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	QUAN-TITY PER EQUIP.	MFR'S DESIG-NATION OR JAN TYPE	CONTRACTOR, GOV'T DWG. OR SPEC. NUMBER
1	HOUSING, AS-215/ARN Antenna Assembly, .050" 3-S Aluminum, 20½" long, 13" wide, 6.050" deep. Eight mounting holes 0.1935" to clear 3/16" machine screw, drilled in flange, drilled for SO-239 Connector and condenser shaft.	Support and reflection.	1	Kings K-905-A	A.F. Dwg. No. 48D12501
2	TUBE, ANTENNA, brass, silver plated, 18" long, ½" O.D., 0.025" wall.	Antenna pick-up	1	Kings K-905-G	A.F. Dwg. No. 48A12507
3	INSULATOR, STANDOFF, G.E. TEXTOLITE #1422. Length overall, 1 1/16" Head, 0.542" long x ½" dia. Body, 0.448" dia. Drilled from head end 0.250" dia. x 1⅜" deep.	Antenna tube support	2	Kings K-905-H	A.F. Dwg. No. 48A12508
4	MOUNTING, CAPACITOR, sheet Aluminum, anodized. One flange center-drilled with 1 1/32" hole for condenser bushing, second flange drilled 3 holes, 0.136" dia., for mounting rivets.	Condenser support	1	Kings K-905-E	A.F. Dwg. No. 48B12504
5	CABLE, low-loss coaxial, JAN Type RG-8/U. Single inner conductor.	Single conductor	1	Kings K-905-C	A.F. Dwg. No. 48B12502
6	CLAMP, CABLE, #22 gauge brass, half-hard, tin plated, 2 mounting holes #30 drill.	Cable support	4	Kings K-905-F	A.F. Dwg. No. 48B12505
7	CONNECTOR, RECEPTACLE.		1	SO-239	S.C. Dwg. No. SC-D-5850
8	LOCKWASHER, 3/16" internal tooth.		1	Kings K-905-U	AN936A516
9	CAPACITOR, VARIABLE, 2.5 mmf minimum capacity. Three plates (2 fixed, 1 movable) air gap 0.040", breakdown voltage (plates meshed) 1000 v. Brass plates, silver plated, ceramic base. Shaft length (to mounting threads of bushing) 4⅜" x ¼" dia. Shaft end slotted for screwdriver adjustment. Condenser dimension along the shaft from end of shaft bushing to end of plate posts 1⅛". Dimensions of ceramic base 1 5/16" x 1 7/32" x 5/32". C-C mounting holes ceramic base 1", mounting holes 3/16" dia., bushing mounting threads 5/16" dia.	Antenna tuning	1	Kings K-905-B	A.F. Dwg. No. 48B12506
10	SCREW, #3-48 x 3/16", round head, cadmium plated.		1	Kings K-905-S	AN515-3-3
11	CAPACITOR, FIXED, 150 mmf, silver mica, oil impregnated, one section, 2% tolerance, cup shaped, 0.450" dia., 1 1/32" depth. 1 terminal, base constitutes second. Test frequency 75 mc. Maximum working voltage 450 volts.	Balance out inductive reactance	1	Kings K-905-L	
12	BRAID, tinned copper, ¼" wide x 2" long.		1	Kings K-905-N	
13	BUSHING, CLAMPING. Brass, cadmium plated.		1	Kings K-905-D	A.F. Dwg. No. 48B12503
14	NUT, ½" hex, cadmium plated.		1	Kings K-905-K	A.F. Dwg. No. 48A12510
15	RIVET, dural, ⅛" dia. x 5/16" long, universal head.		10	Kings K-905-Z	AN470DD4-5
16	RIVET, dural, ⅛" dia. x ¼" long, universal head.		1	Kings K-905-Y	AN470DD4-4
17	SCREW, MACHINE, 8-32 x ⅜", binding head, cadmium plated.		2	Kings K-905-W	AN526-832-6
18	SCREW, MACHINE, #4-40 x 5/16" long, round head, cadmium plated.		4	Kings K-905-P	AN515-4-5
19	INSERT, END, Cadmium plated. Head ½" dia. x ⅛" thick. Body 1 7/16" long (including head) x 0.248" dia., center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.		1	Kings K-905-J	A.F. Dwg. No. 48A12509-2
20	INSERT, END, Cadmium plated. Head ½" dia. x ⅛" thick. Body 1 3/16" long (including head) x 0.248" dia., center drilled with #29 drill. Head end tapped 7/16" with #8-32 tap.		1	Kings K-905-I	A.F. Dwg. No. 48A12509-1
21	LOCKWASHER, #3, internal tooth.		1	Kings K-905-T	AN936A-3
22	NAMEPLATE.		1	Kings K-905-M	
23	RIVET, dural, 3/32" dia. x 3/16" long, universal head.		4	Kings K-905-AA	AN470DD-3-3
24	LOCKWASHER, #8, internal tooth.		2	Kings K-905-O	AN936A8
25	LOCKNUT, 5/16"-32 NEF, brass, nickel plate, 3/32" thick commercial product.		2	Kings K-905-V	
26	LOCKWASHER, #4, external tooth, cadmium plated.		4	Kings K-905-Q	AN936B4
27	NUT, hex, #4-40 x ¼" long, cadmium plated.		4	Kings K-905-X	AN340-4

ANTENNA ASSEMBLY AS-215/ARN
(E. F. JOHNSON CO., WASECA, MINNESOTA
SERIAL NOS. AF2017-AF6213)

REF. No.	NAME OF PART AND DESCRIPTION	FUNCTION	QUANTITY PER EQUIP.	MFR'S DESIGNATION OR JAN TYPE	CONTRACT GOV'T DWG. OR SPEC. NUMBER
1	HOUSING, AS-215/ARN Antenna Assembly, Sheet Dural 0.050″, 20½″ long, 13″ wide, 6.050″ deep. Eight mounting holes 0.1935″ to clear 3/16″ machine screw, drilled in flange, drilled for SO-239 Connector and condenser shaft.	Support and reflection	1		A.F. Dwg. No. 48D12501
2	TUBE, ANTENNA, brass, silver plated, 18″ long, ½″ O.D., 0.025″ wall.	Antenna pick-up	1		A.F. Dwg. No. 48A12507
3	TUBE END, Rex Corp. Rexolite #1422. Length overall, 1 1/16″ Head, 0.542″ long x ½″ dia. Body, 0.447″ dia. Drilled from head end, 0.250″ dia. x 1 3/8″ deep.	Antenna tube support	2		A.F. Dwg. No. 48A12508
4	BRACKET, CONDENSER, sheet Dural, anodized. One flange center-drilled with 11/32″ hole for condenser bushing, second flange drilled 3 holes, 0.136″ dia. for mounting rivets.	Condenser support	1		A.F. Dwg. No. 48B12504
5	CABLE, low-loss coaxial. Single inner conductor. Stranded, size 8.	Single conductor	1	RG-8/U	A.F. Dwg. No. 48B12502
6	BRACKET, CABLE, HALF, #22 gauge brass, half hard, silver plated, 2 mounting holes #30 drill.	Cable support	4		A.F. Dwg. No. 48B12505
7	CONNECTOR, CABLE.		1	SO-239	E. F. Johnson Co. Dwg. No. 22.746
8	LOCKWASHER, 5/16″ internal tooth.		1		No. AN936A516
9	CONDENSER, VARIABLE, 2.0 mmf. minimum capacity. Three plates (1 fixed, 2 movable) air gap 0.046″, breakdown voltage (plates meshed) 1000 v, Brass plates, silver plated; ceramic base. Shaft length (to mounting threads of bushing) 4 3/8″ x ¼″ dia. Shaft end slotted for screwdriver adjustment. Condenser dimension along the shaft from end of shaft bushing to end of plate posts 1⅛″. Dimensions of ceramic base 1 1/32″ x 15/16″ x ¼″. Bushing mounting threads 5/16″ dia.	Antenna tuning	1		E. F. Johnson Co. Dwg. No. 169-16
10	SCREW, #3-48 x 3/16″, round head, cad. plate.		1		AN 515-3-3
11	CONDENSER, FIXED 150 mmf, silver mica, oil impregnated, one section, 2% tolerance, cup shaped, 0.450″ dia. 0.343″ depth. 1 terminal, base constitutes second. Test frequency 75 mc. Maximum working voltage 450 volts.	Balance out inductive reactance	1	Erie Resistor Corp., Erie, Pa., #EA-370	E. F. Johnson Co. Dwg. No. 22.820
12	BRAID, TINNED COPPER, ¼″ wide x 2″ long.		1		E. F. Johnson Co. Dwg. No. 16.263-9
13	BUSHING, SHAFT CLAMPING. Brass, silver plate.		1		A.F. Dwg. No. 48B12503
14	NUT, ½″ hex, silver plated.		1		A.F.Dwg. No. 48A12510
15	RIVET, DURAL, ⅛″ dia. x 5/16″ long, round head.		10		AN470DD4-5
16	RIVET, DURAL, ⅛″ dia. x ⅛″ long, round head.		1		AN470DD4-4
17	SCREW, MACHINE, 8-32 x 3/8″, binding head, cadmium plated.		2		AN526-832-6
18	SCREW, MACHINE, #4-40 x 5/16″ long, round head, cadmium plated.		4		AN515-4-5
19	BRASS CENTER, silver plated. Head ½″ dia. x ⅛″ thick. Body 1 3/16″ long (including head) x 0.248″ dia., center drilled with #29 drill. Head end tapped 7/16″ with 8-32 tap.		1		A.F. Dwg. No. 48A12509-2
20	BRASS CENTER, silver plated. Head ½″ dia. x ⅛″ thick. Body 1 3/16″ long (including head) x 0.248″ dia., center drilled with #29 drill. Head end tapped 7/16″ with #8-32 tap.		1		A.F. Dwg. No. 48A12509-1
21	LOCKWASHER #3, internal tooth.		1		AN936A3
22	NAMEPLATE.		1		E. F. Johnson Co. Dwg. No. 22.811
23	SCREW, SELF-TAPPING #2 x ⅛″ long, binding head.		4		E. F. Johnson Co. Dwg.No.11.812-⅛″
24	LOCKWASHER, #8, internal tooth.		2		AN936A8
25	LOCKNUT 5/16″-32 NEF, brass nickel plate, 3/32″ thick commercial product.		1		E. F. Johnson Co. Dwg. No. 12.133
26	LOCKWASHER #4, external tooth, cadmium plated.		4		AN936B4
27	NUT, HEX, #4-40 x ¼″ long, cadmium plated.		4		AN340-4

ANTENNA ASSEMBLY AS-215/ARN
(TRAD TELEVISION CORPORATION)

REF. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	QUANTITY PER EQUIP.	MFR'S DESIGNATION OR JAN TYPE	CONTRACTOR GOV'T DWG. OR SPEC. NUMBER
1	HOUSING, AS-215/ARN Antenna Assembly, .051" aluminum alloy, 20½" long, 13" wide, 6.051" deep. Eight mounting holes 0.205" dia. drilled in flange, drilled for SO-239 connector and condenser shaft.	Support and reflection	1	Trad 11638	A.F. Dwg. No. 48D12501
2	TUBE ANTENNA, brass, silver plated, 18" long, ½" O.D., 0.025" wall.	Antenna pick-up	1	Trad 11649	A.F. Dwg. No. 48A12507
3	INSULATOR, STANDOFF, Rex Corp. Rexolite #1422. Length overall, $1\frac{9}{16}$". Head, 0.542" long x ½" dia. Body, 0.447" dia. Drilled and reamed from head end, 0.250" dia. x $1\frac{1}{32}$" deep.	Antenna tube support	2	Trad 11650	A.F. Dwg. No. 48A12508
4	MOUNTING, CAPACITOR, aluminum alloy, anodized. One flange center-drilled with $\frac{1}{32}$" hole for capacitor bushing, second flange drilled 3 holes, 0.136" dia., for mounting rivets.	Capacitor support	1	Trad 11646	A.F. Dwg. No. 48B12504
5	CABLE, low-loss coaxial, JAN Type RG-8/U. Single inner conductor.	Single conductor	1	Trad 11644	A.F. Dwg. No. 48B12502
6	CLAMP, CABLE, 0.025" thk., brass, half-hard, tin plated, 2 mounting holes .128" dia.	Cable support	4	Trad 11647	A.F. Dwg. No. 48B12505
7	CONNECTOR, RECEPTACLE.		1	SO-239	S.C. Dwg. No. SC-D-5850
8	LOCKWASHER, $\frac{5}{16}$" internal tooth.		1		AN936A516
9	CAPACITOR, VARIABLE, 2.5 mmf minimum capacity. Three plates (2 fixed, 1 movable) air gap 0.045", breakdown voltage (plates meshed) 1000 v. Brass plates, silver plated, ceramic base. Shaft length (to mounting threads of bushing) 4⅜" x ¼" dia. Shaft end slotted for screwdriver adjustment. Condenser dimension along the shaft from end of shaft bushing to end of plate posts $1\frac{7}{32}$". Dimensions of ceramic base $1\frac{5}{16}$" x $1\frac{3}{16}$" x $\frac{5}{32}$". Bushing mounting threads $\frac{5}{16}$"-32.	Antenna tuning	1	Trad 11648	A.F. Dwg. No. 48B12506
10	SCREW, #3-48 x $\frac{5}{16}$", round head, cadmium plated.		1		AN515-3-3
11	CAPACITOR, FIXED, 150 mmf, silver mica, oil impregnated, one section, 2% tolerance, cup shaped, 0.450" dia., $\frac{11}{32}$" depth. 1 terminal, base constitutes second. Test frequency 75 mc. Maximum working voltage 450 volts.	Balance out inductive reactance	1	Centralab #A830-B	
12	BRAID, copper, ¼" wide x 2" long.		1		
13	BUSHING, CLAMPING, Brass, cadmium plated.		1	Trad 11645	A.F. Dwg. No. 48B12503
14	NUT, locking, ½" hex, $\frac{7}{16}$" thick, brass, cadmium plated, tapped $\frac{7}{16}$"-28, $\frac{21}{64}$" deep.		1	Trad 11652	A.F. Dwg. No. 48A12510
15	RIVET, aluminum, ⅛" dia. x $\frac{5}{16}$" long, universal head.		10		AN470DD4-5
16	RIVET, aluminum, ⅛" dia. x ¼" long, universal head.		1		AN470DD4-4
17	SCREW, MACHINE, 8-32 x ⅜", binding head, cadmium plated.		2		AN526-832-6
18	SCREW, MACHINE, #4-40 x $\frac{5}{16}$" long, round head, cadmium plated.		4		AN515-4-5
19	INSERT, END, brass, cadmium plated, head ½" dia. x ⅛" thick. Body $1\frac{7}{16}$" long (including head) x 0.247" dia., center drilled with #29 drill. Head end tapped $\frac{7}{16}$" with #8-32 tap.		1	Trad 11651-2	A.F. Dwg. No. 48A12509-2
20	INSERT, END, brass, cadmium plated, head ½" dia. x ⅛" thick. Body $1\frac{3}{16}$" long (including head) x 0.247" dia., center drilled with #29 drill. Head end tapped $\frac{7}{16}$" with #8-32 tap.		1	Trad 11651-1	A.F. Dwg. No. 48A12509-1
21	LOCKWASHER, #3, internal tooth.		1		AN936A-3
22	NAMEPLATE.		1	Trad 11694	
23	RIVET, brass, nickel plated, .088" dia. x $\frac{5}{32}$" long, oval head tubular.		4		AN470DD-3-3
24	LOCKWASHER, #8, internal tooth.		2		AN936A8
25	NUT, hex, $\frac{5}{16}$"-32 NEF-2, cadmium plated.		2		
26	LOCKWASHER, #4, external tooth, cadmium plated.		4		AN936B4
27	NUT, hex, 4-40 NC-2, cadmium plated.		4		AN340-4